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ABSTRACT

A management information system (MIS) is applied to a medium sized general museum to reflect the actual curatorial/registration functions. The recordkeeping functions of loan and conservation activities are examined since they too can be effectively handled by computer and constitute a complementary data base to the accession/catalog information. Museum master files for accession, loan, conservation, and master catalog files; and appendices which include accession, loan, and conservation file data categories, sample forms, and selected references, are also included. (Author/MBR)

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MUSEUM DATA BANK RESEARCH REPORT

Number 12

A Management Information System Design for a General Museum

by

Sandra Scholtz

November 1976

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

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IR000067

Introduction

More and more Museum personnel are looking to computerized systems with the hope that they can provide needed assistance in the proper curation of museum collections. In the past few years the Museum Data Bank Committee has discussed and developed ideas in the realm of computerized museum catalogs; the results of these discussions have appeared as research reports published by the committee and the book, Museum Cataloging in the Computer Age, by Robert Chenhall (1975). The present paper will attempt to take the discussion beyond the level of cataloging to encompass the multi-functions related to the collections themselves. A medium-sized general museum is examined for the explication of these functions and they are found to include for this particular museum accessioning, registration, cataloging, loaning, and conserving. All of these activities require record keeping which rests ultimately on the ability to uniquely identify items in the collection. I am proposing that all of these functions be considered in a museum management information system, and would stress this idea particularly for the accessioning/registration/cataloging complex of activities.

Carl Guthe (1964: 36) has defined registration as the assignment of an object to "...an individual place in a list or register of the materials in the collections in such a manner that it cannot be confused with any other object listed." Proper registration thus serves to link the item to the appropriate documentary information. Items in a museum are registered as both part of an accession with a unique accession number, and in a catalog with a unique catalog number. These constitute two different kinds of documentary information concerning the collections. The accession documentation is concerned primarily with the source and nature of the acquisition rather than with the identification and classification of the items themselves. This is an important kind of collection documentation and has been given some attention by museum data processing applications as evidenced by the definition of data categories to handle these items of information. For example, Chenhall defines a dozen or so such categories to document the "history of the object." Also, an examination of the Manual for Museum Computer Network Data Preparation (Vance 1975) produces a dozen or so data categories which are classed as acquisition categories. Our recognition of these data categories, however, has usually been in the context of catalogs rather than in the context of an accession file. We have, by defining the categories, implied that accession documentation can be handled in computerized records but we have not discussed adequately alternative ways to do this effectively.

This paper, then, addresses the question of a total registration system for a general museum. A management information system has been designed to reflect the actual registration/curatorial functions found to exist in the museum examined. I have included in this management information system the record-keeping functions of loan and conservation activities because they too can be effectively handled by computer and constitute a complementary data base to the accession/catalog information. A total registration system such as the one described can be shown to have the potential to generate many different kinds of reports of interest to museum administrators as well as reports of interest to museum researchers.

The University of Arkansas Museum

The University of Arkansas Museum is probably a somewhat typical medium-sized general museum and as such, may well serve as a test case for a management information system design. The museum serves as a repository for a number of sizable collections, including historical, archeological, ethnographic, and natural history collections. The entire collection numbers over one million separate items. The curatorial responsibilities of the museum staff to the collection include cataloging, storage, conservation measures as they are needed, and making portions of the collections available for research, classroom use, and exhibit purposes.

The museum registrar maintains an accession file for everything that is accepted by the museum (Fig. 1). This file identifies (with an accession number) a "lot" of material which came to the museum as a gift, a research collection, or as the result of a purchase. The file contains information relevant to the general identification of the material and the conditions under which it was obtained. The accession number is placed on the material itself for identification purposes. The accession file is maintained manually in a log book.

As time permits, various members of the museum staff catalog portions of the collections. This involves doing research on a collection to identify individual items in the collection. Each item is given an additional number (consecutive numbers within each accession number) and this number is placed on the item as well as on a catalog card which contains information about the item (Dudley and Wilkinson 1977). These card catalogs are maintained by the museum registrar. They are organized by number, first by accession number, then by catalog number. Only for one small collection of pressed glass is there a cross-indexed file. For this collection of some 1500 items, the card catalog is cross-indexed on one item of information--pattern name.

In addition to its collections, the museum maintains a large and continuously growing black and white photograph and color slide file. The black and white photographs are mounted on cardboard and stored in filing cabinets by topical headings or provenience. Color slides, fewer in number, are kept in special files for slides, but with little formal organization.

There are two kinds of activities, in addition to accessioning and cataloging, within the museum that concern the collections and require record keeping. These are the loan and conservation activities. The museum carries out an active loan program, most of which involves the loan of collections to be used in conjunction with classes on this campus. Some loans, however, are made to other campuses and other musems as well. Current loans include exhibit materials to 30-odd museums, libraries, visitors centers, and high schools, including mineral specimens loaned to the Smithsonian for their bicentennial exhibition and prehistoric pottery vessels for the Sacred Circles exhibition, showing at the Hayward Gallery in London and the Nelson Art Gallery in Kansas City. Loan records are kept manually by the registration staff.

Conservation activities represent a continuing function of the museum registrar who, by virtue of special interest and training, serves also as the conservator. Some collections need some kind of conservational attention only

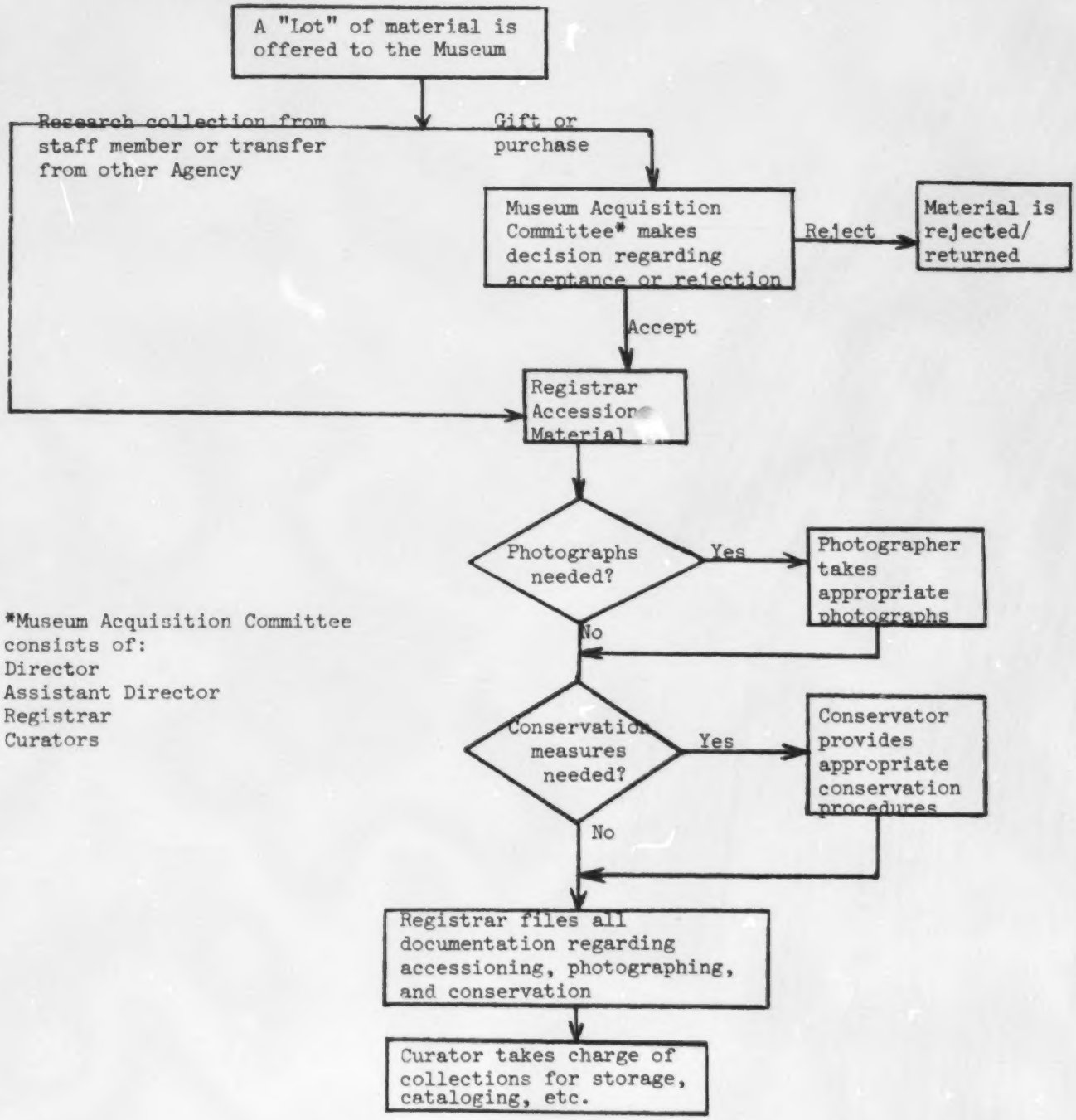

Figure 1. Acquisition Flow Chart

once, but other items may need periodic treatment of some kind (such as changing the preservative in bottled zoological specimens). Many of the collections need to be checked regularly for evidence of preservation problems which need attention. All conservation measures taken need to be thoroughly and permanently recorded and an efficient technique is needed for keeping track of periodic conservation measures.

Obviously some of the existing files in the museum could be more efficiently handled by computer. For example, since the accession and catalog files are organized by number, one must search the entire file manually to find information relating to a particular kind of item. The system design described below will serve not only to store the information, but to function as a cross-index on any number of categories of data. But the present design was undertaken with a broader objective than just the production of cross-indexed catalogs.

The Management Information System

As stated in the introduction, the management information system described below was designed to encompass and expedite the museum's functions of accessioning, cataloging, loaning, and conserving. The design represents an attempt to amalgamate the separate computerized files into a functioning system in which some parts may complement other parts and duplication of effort is minimized. Any of the files could contain information that is relevant to proper curation of items in the collections, and it is desirable that all of the information be accessible as part of the same system.

The remainder of this paper consists of the details of the management information system designed to handle the data processing needs of the Museum. This sysytem has been designed around the use of a storage and retrieval program system called GRIPHOS (General Retrieval and Informations Processor for Humanitites Oriented Studies). For those who are unfamiliar with it, a brief description of the GRIPHOS system, as well as this application of it, seems warranted.

The general design of the GRIPHOS system is based on the requirements of logical records composed of variable structures of an arbitrary number of unordered variable length fields. The fields of data within a record, which may also be called data categories, are indentified and processed by tag identifiers which are stored along with the field of information. GRIPHOS files are organized by direct access, thus each record has an address by which it can be located directly to be corrected, processed, or otherwise manipulated. It is possible, therefore, through the use of storage addresses, to process only records of interest and not an entire file.

The GRIPHOS system supports the creation and updating of inverted index files. These files function as indexes to the master files by storing addresses of locations of records in the master files which contain the different data values for indexed data categories. Any data category may be indexed and the indexes may be corrected as master file records are corrected, and may be updated as master files are enlarged.

The GRIPHOS system supports a JOIN capability which allows the joining of separate records which may be in the same or separate files. A pointer in the first record locates the second record by its address wherever it resides. The second record may be accessed as if it were part of the first record. The second set of records (those pointed to) must each have a unique identifier, and many records in the first set may point to the same record in the second set. An example of a JOIN application will be explained below with reference to catalog files joined to the accession file.

There exist retrieval programs in the system which will produce printed reports on any data categories requested from any records specified by addresses or address range. These addresses may be supplied as the result of a special query of the file and may be obtained with or without the use or an index file. Retrieved data categories can be organized in numerous different ways--any permutation of the data categories would be possible. Therefore a very large number of different reports could be produced from any master file. In addition, the index files take advantage of the direct access organization of the master files and make special queries economically feasible.

The management information system designed for the Museum includes the following GRIPHOS master files: an accession file, a conservation file, a loan file, a photo/slide file with a JOINED photo subject file (which will be explained below), and several catalog files for different collections, e.g., a geology file, an historical file, a biological file, and so on, each of which is JOINED to the accession file. Several master files will have inverted index files to allow efficient retrieval; there is planned a photo-slide index file as well as index files for each of the catalog files. Figure 2 graphically illustrates the system design for the museum application.

Description of Museum Master Files

Accession File

The accession file will serve as the hub of the catalog files. The records in this file will each pertain to one accession, and each record will be uniquely identified by the accession number. The information to be recorded in each record will concern the type of the accession (purchase, gift, etc), the person(s) or organization responsible (benefactor, vendor, collector, expedition), date of the acquisition, storage location, and the nature of the material, and other such categories of data which pertain to the whole accession. (Appendix A-1 lists the tag numbers, data categories, and definitions to be used in this file.) The descriptive information recorded in this file can be very general, consisting of only a brief and general description of what is present, or it can be much more informative, listing individual items or categories of items in the accession. The need for greater descriptive detail in the accession file for certain kinds of collections will be determined by the registration staff and will depend on such considerations as how certain collections have been used in the past and how soon computerized catalogs may be available.

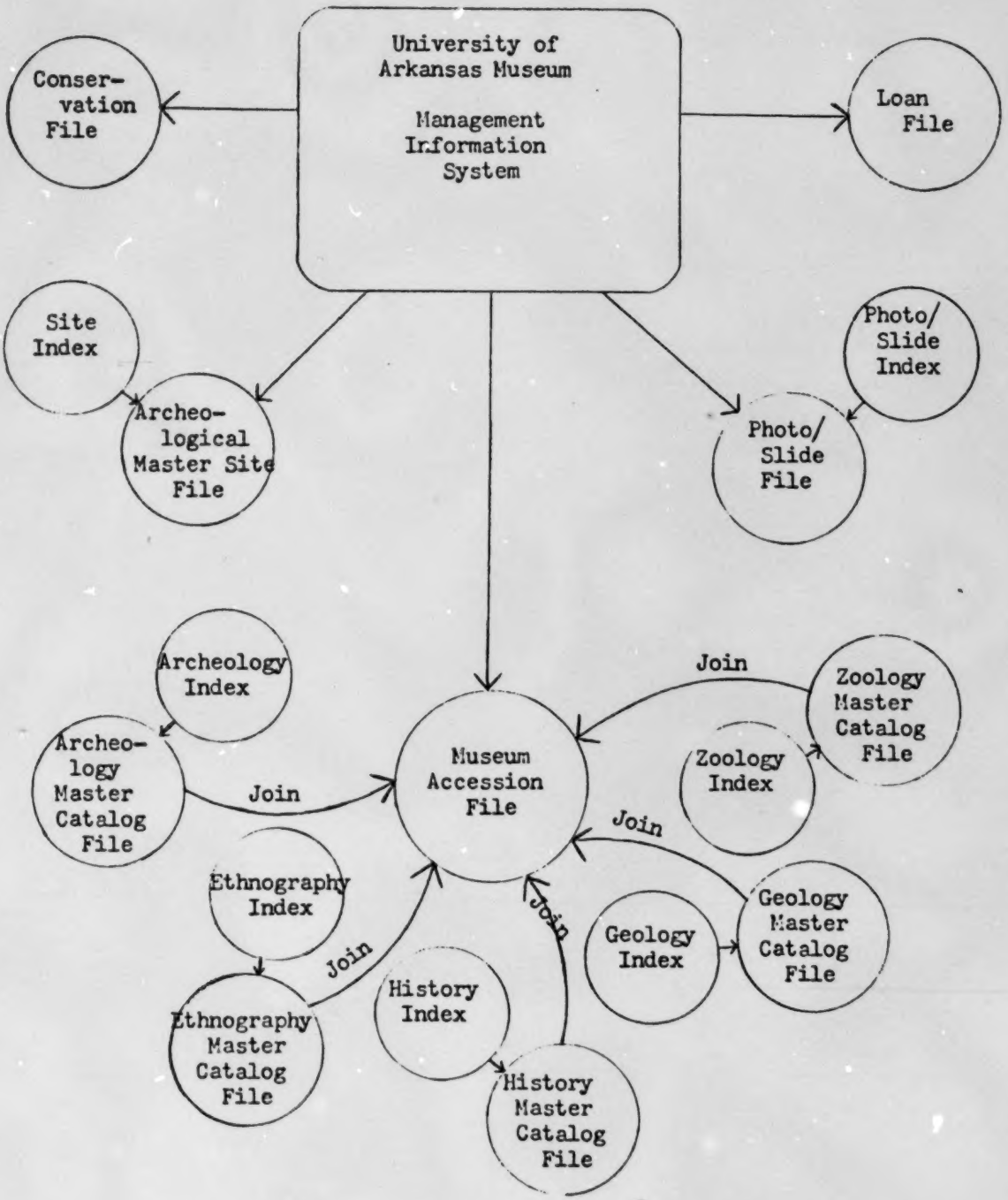

Figure 2. A Management Information System Design for the University of Arkansas Museum

A large number of different report formats will produce many useful summaries of the information regarding the museum's accessions. For example, reports generated will include those organized by donor, by type of accession, by nature of material accessioned, or any permutation of the categories recorded. They may organize accessions from the entire history of the museum or by year or some particular period of time. Such reports will replace similar ones that are done manually in the preparation of the museum's annual report, as well as augment the traditional reports with ones designed to facilitate the registration staff in curating the collections.

As stated above, the master catalog files will be JOINED to the accession file via the accession number category in both accession records and catalog records. This effectively makes all of the appropriate accession information available to every catalog record as if it were duplicated in every catalog record when actually accession information is recorded only once in a computerized file. The same effect would be obtained by a single hierarchically structured file, but there are processing and maintenance advantages to having separate, yet joined, unit record accession and catalog files.

The archeological collection will be described in reasonable detail in the accession file. A supplementary accession sheet is being used for archeological materials (Appendix A-2), because the entire archeological collection is being inventoried for more detailed information regarding the materials and kinds of artifacts present. The staff that would be required to produce computerized catalogs of the entire archeological collection is not available now and is not likely to be available in the near future simply because of the enormity of the collection, and the fact that it is being increased substantially every year by virtue of the Arkansas Archeological Survey's continuous research activities. The more detailed inventory information in the accession file regarding the archeological collections will be tremendously useful in answering queries of the collection in the absence of computerized catalogs. It also will provide data necessary for estimating future storage requirements for the archeology collections.

Loan File

This is a file of all loan transactions in the Museum. When a loan is contracted, a record is created in the loan file and is flagged "ACTIVE". When a loan is terminated (item(s) returned), ACTIVE is changed to DEAD and the date of return is recorded. In this way there is a documentary record for all loans, both dead and active. If desired, one could periodically (perhaps yearly) print out a report to be permanently filed of all dead loans and then purge these records from the file. On the other hand, maintaining the DEAD records in the file would allow the periodic integrating of all records to produce reports analyzing loan patterns to date.

Examples of standard reports which could be produced from the information in the loan file include periodic reports of ACTIVE loans, periodic reports of DEAD loans, loan recipient report, reports on the nature of material loaned and many other possible organizations of the information in this file.

In addition to the standard reports to be produced from the loan file, the file can be scanned at any time to look for overdue loans. This can be accomplished by comparing the current date with the contracted termination date for all ACTIVE loans and retrieving informations about those that are overdue.

The data categories and definitions to be used in the loan file are listed in Appendix B.

Conservation File

The purpose of the conservation file is two-fold: to serve as a monitoring device for needed conservation measures and checking procedures for preservation problems and to maintain a conservation history for any given item or collection. A record will be added to the file each time a conservation measure is taken or needed on some item(s). If the same treatment is given to an entire collection, such as all bottled zoological specimens, then the individual catalog numbers are not indicated in the conservation record. Otherwise each item involved is listed by catalog number so this permanently associates a date and treatment with each catalog number.

Future treatments or regular checks needed and their associated dates are recorded and these categories are to be monitored periodically to produce a report, perhaps quarterly, of conservation measures needed. This report will be useful in planning the staff's activities for that period, since some conservation measures are very time consuming.

In addition to the monitoring report, the conservation file will have the potential for a large number of report formats. Examples include report of conservation history by item or collection, conservation measures administered by period, conservation measures administered by material receiving treatment, and conservation measures administered by culture area.

The data categories to be used in the conservation file are listed in Appendix C.

Master Catalog Files

A number of separate catalog files are included in the system. These include catalogs for ethnographic, archeological, zoological, geological, and historical collections. These catalog entries will contain only information identifying the items themselves and will not duplicate the acquisition documentation recorded in the accession file. Instead, catalog records will be JOINED to accession records as described above.

In addition to these catalog files, the system includes a master file for the cataloging of black and white photographs and color slides. A subject index is treated separately and the catalog records are JOINED to this index. The photograph files were described in detail in a paper given at the 1976 Society for American Archeology meeting and will be published as a part of the

proceedings of the Symposium on Data Processing in Archeology, so will not be discussed in depth here. The system also includes a file of information about archeological sites in Arkansas. The archeological site file has been described by Scholtz and Chenhall (1976).

I am not discussing the content of catalog files here, since this is outside the intended scope of this paper. Chenhall (1975), Vance (1975), and others have discussed appropriate data categories for computerized museum catalogs.

Summary and Conclusion

This paper has presented a structural plan for a management information system for a general museum. It was based on a study of the activities involved in the registration and curation of collections in a particular museum. The basic position being taken in the presentation is that computers can do more for those concerned with the care and use of museum collections than just provide catalogs. It is not my intention to play down the importance of computerized catalogs, but simply to demonstrate that the catalogs possibly can be more efficiently designed as a part of a total registration system. In actual practice accessioning and cataloging are separate steps in the process stream, both of which result in a set of documentation for items in the collections. Proper planning for the handling of both of these sets of documentation should produce efficient computer use in museums while providing multipurpose functions.

The recording of accession information in every catalog record obviously is inefficient. The design described in this paper eliminated this inefficiency by JOINING catalog files to an accession file. This solution is dependent upon the particular data retrieval system used (GRIPHOS); our management information system designs necessarily are going to reflect the data retrieval system available to us. There would be other methods for efficiently handling the same information, depending on the capabilities of other systems. For example, hierarchically structured records could be used to eliminate redundancy in systems that do not allow references from one file to another. Other techniques, such as merging data retrieved from separate files into one report could be used to accomplish the same purpose.

APPENDIX A-1

Accession File Data Categories

Tag Number	Nature of Data
M1	Accession Number of the item(s). This number will consist of 2 sets of digits separated by a hyphen. The two digits indicate the year in which the accession was made, and the last set of digits indicate the sequential number of the accession within that year (e.g., 75-146).
3	Type of Accession - indicates whether the accession is a loan, purchase, gift, or research collection.
12	Benefactor (Donor) - the name of the person or organization that gave, bequeathed or lent the item(s).
14	Vendor - the person or organization from whom the item(s) was (were) purchased.
16	Expedition - official name of the expedition which collected the item(s).
22	Date of Acquisition
M2	Nature of Accession - a brief and general description indicating what the accession consists of.
M3	General Classification - A standardized authority list should be developed. Examples are ETHNOGRAPHIC, ZOOLOGICAL.
62	Location - indicate storage location if other than the Museum storage facilities, e.g. permanently stored in Physical Anth. Lab.
M4	Remarks
176	Site Number - the 3-part state site number will be recorded for archeological accessions.
M5	Collection Location - used for non-archeological collections.
18	Collector
20	Date of Collection

APPENDIX A-1

Tag Number	Nature of Data
32	Items in the Accession - a word or phrase identifying individual items or kind of items in the accession. A standardized authority list should be developed. this category may be entered one or many times.
48	General Material Categories - a standardized entry to identify gererally the kinds of material represented in the accession.
M6	Number of Standard Boxes - this is in effect an estimate of the required storage space in terms of a standard unit. This is appropriate only for those collections normally stored in boxes, e.g. most of the archeological and geological collections.
M7	Provenience Information/Documentation - if such is available, record YES, if not, record NO.

APPENDIX A-2

ACCESSION NUMBER:_____ SITE NAME/COLLECTION NAME:_____

NUMBER OF STANDARD BOXES:_____ SITE NUMBER:_____

PROVENIENCE INFORMATION: YES_____ NO_____

COMMENTS:_____

_____

MATERIAL CATEGORIES: @#

STONE _____

BONE _____

SHELL _____

CERAMICS _____

METAL _____

PERISHIBLES _____

KEY:

: present

0 : absent

: actual count

% : approximation

COMMENTS:_____

_____

ARTIFACT CATEGORIES:

____ FAUNAL REMAINS

____ BONE TOOLS/DECORATED BONE

____ HAFTED ARTIFACTS

____ WOODEN ARTIFACTS

____ BANNERSTONE/ATLATL WEIGHTS/BOATSTONES

____ PIPES
- ____ Stone
- ____ Ceramic

____ CELTS

____ GROOVED AXES, GROUND STONE

____ CHIPPED STONE AXES

____ SPATULATE CELTS/SPUDS

____ LARGE BIFACIALLY FLAKED KNIVES

____ BEADS
- ____ Shell
- ____ Stone
- ____ Ceramic
- ____ Glass

____ GORGETS/PENDANTS

____ EAR SPOOLS

____ PIGMENTS

____ FOOD REMAINS

____ PROFECTILE POINTS
- ____ Fluted Points

____ RESTORABLE POTTERY VESSELS

____ PLUMMETS

____ MANOS ____ METATES

____ CHARCOAL SAMPLE

____ HAMMERSTONES

____ CONTACT MATERIAL/TRADE GOODS

____ HOES (kind)_____

____ HUMAN SKELETAL MATERIAL

____ WHOLE POTTERY VESSELS

OTHER_____

APPENDIX B

Loan File Data Categories

Tag Number	Nature of Data
M8	Loan Transaction Number - sequential number which appears on the loan forms.
M9	Recipient - name of person or organization receiving the Item(s).
M10	Date of Loan - date the loan is made.
M11	Termination Date - date the loan is to end and the item(s) to be returned. Format to be used is YY-MM-DD. Leading zeros should be used for one digit month and day designations.
M12	Catalog Number of Loaned Item - a three part catalog number. If more than one item is loaned, this category should be entered once for each separate catalog number.
M13	Number of Items Loaned - a total.
M14	Status of Loan - record ACTIVE or DEAD.
M15	Special Conditions of Loan - any special conditions agreed upon by either party.
M16	Nature of Material Loaned - a word or phrase indicating what was loaned.
M17	Date Returned - nothing recorded until item(s) returned.

APPENDIX C

Conservation File Data Categories

Tag Number	Nature of Data
M18	Conservation Activity Number - a consecutive number on the conservation record forms.
M19	Catalog Number of Item - catalog number of item(s) either needing or receiving treatment. Enter the category separately for each catalog number when more than one item either needs or receives the same treatment.
M20	General Identification of Items - used if items are numerous and are not listed by catalog number.
M21	Nature of Treatment Given - statement of conservation steps taken.
M22	Date Treatment Given - date is given in the following format: YY/MM/DD.
M23	Nature of Material Treated - authority list is to be used. Examples are WOOD, IVORY.
M24	General Classification of Item - authority list used. Examples are ZOOLOGICAL, ETHNOGRAPHIC, HISTORICAL.
M25	Culture Area - to be used for ethnographic materials.
M26	Nature of Treatment Needed - use this category also to record checks needed.
M27	Year Treatment Needed - use format YY. Enter the word EACH in all records for regular checks.
M28	Month Treatment Needed - use format MM.

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